

**FEDERAL COMMUNICATIONS COMMISSION**  
**SATELLITE SPACE STATION AUTHORIZATIONS**  
**(Technical and Operational Description)**

**S1. GENERAL INFORMATION** Complete for all satellite applications.

|  |  |  |
|--|--|--|
| a. Space Station or Satellite Network Name:<br>DIRECTV 8 | e. Estimated Date of Placement into Service:<br>6/25/2005                | i. Will the space station(s) operate on a Common Carrier Basis:<br>N   |
| b. Construction Commencement Date:<br>12/11/1999         | f. Estimated Lifetime of Satellite(s):<br>12.6 Years                     | j. Number of transponders offered on a common carrier basis:<br>0  |
| c. Construction Completion Date:<br>3/15/2005            | g. Total Number of Transponders:<br>16                                   | k. Total Common Carrier Transponder Bandwidth:<br>0 MHz  |
| d. Estimated Launch Date:<br>4/1/2005                    | h. Total Transponder Bandwidth (no. transponders x Bandwidth)<br>384 MHz | l. Orbit Type: Mark all boxes that apply:<br><input checked="" type="checkbox"/> <b>GSO</b> <input type="checkbox"/> <b>NGSO</b> |

**S2. OPERATING FREQUENCY BANDS** Identify the frequency range and transmit/receive mode for all frequency bands in which this station will oper  
Also indicate the nature of service(s) for each frequency band.

| Frequency Band Limits |                 |                       |                 | e. T/R Mode | f. Nature of Service(s): List all that apply to this band |
|-----------------------|-----------------|-----------------------|-----------------|-------------|---|
| Lower Frequency (.Hz) |                 | Upper Frequency (.Hz) |                 |             |   |
| a. Numeric            | b. Unit (K/M/G) | c. Numeric            | d. Unit (K/M/G) |             |   |
| 17.3                  | G               | 17.8                  | G               | R           | Fixed Satellite Service                                   |
| 12.2                  | G               | 12.7                  | G               | T           | Broadcasting Satellite Service - Video                    |

**S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:**

|   |   |   |
|---|---|---|
| a. Nominal Orbital Longitude (Degrees E/W):<br>100.85 W | b. Alternate Orbital Longitude (Degrees E/W):   | c. Reason for orbital location selection: |
| Longitudinal Tolerance or E/W Station-Keeping:          | f. Inclination Excursion or N/S Station-Keeping Tolerance:  |   |
| d. Toward West: 0.05 Degrees                            | Range of orbital are in which adequate service can be provided (Optional):<br>Degrees E/W<br>g. Westernmost:<br>h. Easternmost: |   |
| e. Toward East: 0.05 Degrees                            | 0.05 Degrees  |   |
| i. Reason for service are selection (Optional):         |   |   |

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Page 2: NGSO Orbits

**S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY**

S4a. Total Number of Satellites in Network or System:

S4c. Celestial Reference Body (Earth, Sun, Moon, etc.):

S4b. Total Number of Orbital Planes in Network or System:

S4d. Orbit Epoch Date:

For each Orbital Plane Provide:

| (e) Orbital Plane No. | (f) No. of Satellites in Plane | (g) Inclination Angle (degrees) | (h) Orbital Period (Seconds) | (i) Apogee (km) | (j) Perigee (km) | (k) Right Ascension of the Ascending Node (Deg.) | (l) Argument of Perigee (Degrees) | Active Service Arc Range (Degrees) |               |           |
|-----------------------|--------------------------------|---------------------------------|------------------------------|-----------------|------------------|--|-----------------------------------|------------------------------------|---------------|-----------|
|                       |                                |                                 |                              |                 |                  |  |                                   | (m) Begin Angle                    | (n) End Angle | (o) Other |

**S5. INITIAL SATELLITE PHASE ANGLE** For each satellite in each orbital plane, provide the initial phase angle.

| (a) Orbital Plane No. | (b) Satellite Number | (c) Initial Phase Angle (Degrees) |
|-----------------------|----------------------|-----------------------------------|
|-----------------------|----------------------|-----------------------------------|

**NO NGSO DATA FILED**

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**Page 3: Service Areas**

S6. SERVICE AREA CHARACTERISTICS for each service area provide:

| (a) Service Area ID | (b) Type of Associated Station (Earth or Space) | (c) Service Area Diagram File Name (GXT File) | (d) Service Area Description. Provide list of geographic areas (state postal codes or ITU 3-ltr codes), satellites or Figure No. of Service Area Diagram. |
|---------------------|---|---|---|
| CONUS1              | S   |   | CONUS+Alaska+Hawaii   |
| LACR1               | S   |   | Los Angeles, CA+Castle Rock, CO   |

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Page 4: Antenna Beams

S7. SPACE STATION ANTENNA BEAM CHARACTERISTICS For each antenna beam provide:

| (a)<br>Beam<br>ID | (b)<br>T/R<br>Mode | Isotropic Antenna<br>Gain |                   | (e)<br>Pointing<br>Error<br>(Degrees) | (f)<br>Rotational<br>Error<br>(Degrees) | (g) Min.<br>Cross-<br>Polar Iso-<br>lation (dB) | (h) Polar-<br>ization<br>Switch-<br>able?<br>(Y/N) | (i) Polarization<br>Alignment Rel.<br>Equatorial<br>Plane (Degrees) | (j) Service<br>Area ID | Transmit                       |                                      |                              | Receive                            |                                       |  | Input Attenuator (dB) |                  |
|-------------------|--------------------|---------------------------|-------------------|---------------------------------------|---|---|--|---|------------------------|--------------------------------|--------------------------------------|------------------------------|------------------------------------|---------------------------------------|--|-----------------------|------------------|
|                   |                    | (c) Peak<br>(dBi)         | (d) Edge<br>(dBi) |                                       |   |   |  |   |                        | (k)<br>Input<br>Losses<br>(dB) | (l) Effective<br>Output<br>Power (W) | (m)<br>Max.<br>EIRP<br>(dBW) | (n)<br>System<br>Noise<br>Temp (K) | (o) G/T<br>Max.<br>Gain Pt.<br>(dB/K) | (p) Min.<br>Saturation<br>Flux Density<br>(dBW/m2) | (q) Max.<br>Value     | (r) Step<br>Size |
| DL_1              | T                  | 35.7                      | 15.6              | 0.14                                  |   | 30  | N  |   | CONUS1                 | 1.9                            | 224                                  | 57.3                         |                                    |                                       |  |                       |                  |
| UL1               | R                  | 32.3                      | 29.3              | 0.14                                  |   | 30  | Y  |   | LACR1                  |                                |                                      |                              | 1023                               | 2.2                                   | -93.5  | 31                    | 1                |

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**Page 5: Beam Diagrams**

S8. ANTENNA BEAM DIAGRAMS For each beam pattern provide the reference to the graphic image and numerical data:  
Also provide the power flux density levels in each beam that result from the emission with the highest power flux density.

| (a)<br>Beam<br>ID | (b)<br>T/R<br>Mode | (c) Co-or<br>Cross<br>Polar<br>Mode ("C"<br>or" X") | (d) GSO<br>Ref.<br>Orbital<br>Longitude<br>(Deg. E/W) | (e) NGSO Antenna Gain<br>Contour Description<br>(Figure/Table/ Exhibit) | (f) GSO Antenna<br>Gain Contour Data<br>(GXT File) | Max. Power Flux Density (dBW/M2/Hz)                                  |            |            |            |            |
|-------------------|--------------------|---|---|---|--|--|------------|------------|------------|------------|
|                   |                    |   |   |   |  | At Angle of Arrival above horizontal (for emission with highest PFD) |            |            |            |            |
|                   |                    |   |   |   |  | (g) 5 Deg  | (h) 10 Deg | (i) 15 Deg | (j) 20 Deg | (k) 25 Deg |
| DL_1              | T                  | C   | -101  |   | D8TX_CO.gxt  |  |            |            |            |            |
| DL_1              | T                  | X   | -101  |   | D8TX_X.gxt   |  |            |            |            |            |
| UL1               | R                  | C   | -101  |   | D8RX_CO.gxt  |  |            |            |            |            |
| UL1               | R                  | X   | -101  |   | D8RX_X.gxt   |  |            |            |            |            |

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**Page 6: Channels and Transponders**

S9. SPACE STATION CHANNELS For each frequency channel provide: S10. SPACE STATION TRANSPONDERS For each transponder provide:

| (a)<br>Channel<br>No. | (B) Assigned<br>Bandwidth<br>(kHz) | (c)<br>T/R<br>Mode | (d) Center<br>Frequency<br>(MHz) | (e)<br>Polarization<br>(H, V, L, R) | (f) TTC<br>or Comm<br>Channel<br>(T or C) |
|-----------------------|------------------------------------|--------------------|----------------------------------|-------------------------------------|---|
| A0001                 | 24000                              | R                  | 17324                            | R                                   | C   |
| A0003                 | 24000                              | R                  | 17353.16                         | R                                   | C   |
| A0005                 | 24000                              | R                  | 17382.32                         | R                                   | C   |
| A0007                 | 24000                              | R                  | 17411.48                         | R                                   | C   |
| A0009                 | 24000                              | R                  | 17440.64                         | R                                   | C   |
| A0011                 | 24000                              | R                  | 17469.8                          | R                                   | C   |
| A0013                 | 24000                              | R                  | 17498.96                         | R                                   | C   |
| A0015                 | 24000                              | R                  | 17528.12                         | R                                   | C   |
| A0017                 | 24000                              | R                  | 17557.28                         | R                                   | C   |
| A0019                 | 24000                              | R                  | 17586.44                         | R                                   | C   |
| A0021                 | 24000                              | R                  | 17615.6                          | R                                   | C   |
| A0023                 | 24000                              | R                  | 17644.76                         | R                                   | C   |
| A0025                 | 24000                              | R                  | 17673.92                         | R                                   | C   |
| A0027                 | 24000                              | R                  | 17703.08                         | R                                   | C   |
| A0029                 | 24000                              | R                  | 17732.24                         | R                                   | C   |
| A0031                 | 24000                              | R                  | 17761.4                          | R                                   | C   |
| C0001                 | 24000                              | T                  | 12224                            | R                                   | C   |
| C0003                 | 24000                              | T                  | 12253.16                         | R                                   | C   |
| C0005                 | 24000                              | T                  | 12282.32                         | R                                   | C   |
| C0007                 | 24000                              | T                  | 12311.48                         | R                                   | C   |
| C0009                 | 24000                              | T                  | 12340.64                         | R                                   | C   |
| C0011                 | 24000                              | T                  | 12369.8                          | R                                   | C   |
| C0013                 | 24000                              | T                  | 12398.96                         | R                                   | C   |
| C0015                 | 24000                              | T                  | 12428.12                         | R                                   | C   |
| C0017                 | 24000                              | T                  | 12457.28                         | R                                   | C   |
| C0019                 | 24000                              | T                  | 12486.44                         | R                                   | C   |
| C0021                 | 24000                              | T                  | 12515.6                          | R                                   | C   |
| C0023                 | 24000                              | T                  | 12544.76                         | R                                   | C   |
| C0025                 | 24000                              | T                  | 12573.92                         | R                                   | C   |
| C0027                 | 24000                              | T                  | 12603.08                         | R                                   | C   |

| (a)<br>Transponder<br>ID | (b)<br>Transponder<br>Gain (dB) | Receive Band       |                | Transmit Band      |             |
|--------------------------|---------------------------------|--------------------|----------------|--------------------|-------------|
|                          |                                 | (c) Channel<br>No. | (d) Beam<br>ID | (e) Channel<br>No. | (f) Beam ID |
| T0001                    | 134.7                           | A0001              | UL1            | C0001              | DL_1        |
| T0002                    | 134.7                           | A0003              | UL1            | C0003              | DL_1        |
| T0003                    | 134.7                           | A0005              | UL1            | C0005              | DL_1        |
| T0004                    | 134.7                           | A0007              | UL1            | C0007              | DL_1        |
| T0005                    | 134.7                           | A0009              | UL1            | C0009              | DL_1        |
| T0006                    | 134.7                           | A0011              | UL1            | C0011              | DL_1        |
| T0007                    | 134.7                           | A0013              | UL1            | C0013              | DL_1        |
| T0008                    | 134.7                           | A0015              | UL1            | C0015              | DL_1        |
| T0009                    | 134.7                           | A0017              | UL1            | C0017              | DL_1        |
| T0010                    | 134.7                           | A0019              | UL1            | C0019              | DL_1        |
| T0011                    | 134.7                           | A0021              | UL1            | C0021              | DL_1        |
| T0012                    | 134.7                           | A0023              | UL1            | C0023              | DL_1        |
| T0013                    | 134.7                           | A0025              | UL1            | C0025              | DL_1        |
| T0014                    | 134.7                           | A0027              | UL1            | C0027              | DL_1        |
| T0015                    | 134.7                           | A0029              | UL1            | C0029              | DL_1        |
| T0016                    | 134.7                           | A0031              | UL1            | C0031              | DL_1        |
| C1                       |                                 | CMD                | UL1            |                    |             |
| T1                       |                                 |                    |                | TLM1               | DL_1        |
| T2                       |                                 |                    |                | TLM1               | DL_1        |

|       |       |   |          |   |   |
|-------|-------|---|----------|---|---|
| C0029 | 24000 | T | 12632.24 | R | C |
| C0031 | 24000 | T | 12661.4  | R | C |
| CMD   | 2000  | R | 17307    | L | T |
| TLM1  | 2000  | T | 12203.25 | L | T |
| TLM2  | 2000  | T | 12203.75 | L | T |

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Page 7: Digital Modulation

S11. DIGITAL MODULATION PARAMETERS For each digital emission provide:

| (a) Digital Mod. ID | (b) Emission Designator | (c) Assigned Bandwidth (kHz) | (d) No. of Phases | (e) Uncoded Data Rate (kbps) | (f) FEC Error Correction Coding Rate | (g) CDMA Processing Gain (dB) | (h) Total C/N Performance Objective (dB) | (i) Single Entry C/I Objective (dB) |
|---------------------|-------------------------|------------------------------|-------------------|------------------------------|--------------------------------------|-------------------------------|--|-------------------------------------|
| DTH                 | 24M0G7W                 | 24000                        | 4                 | 40000                        | 0.857                                |                               | 7.6                                      | 28                                  |

## Page 8: Analog Modulation

[illegible]

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**Page 9: Typical Emissions**

S13. TYPICAL EMISSIONS For each planned type of emission provide:

| Associated Transponder ID Range |         | Modulation ID           |                        | (e) Carriers per Transponder | (f) Carrier Spacing (kHz) | (g) Noise Budget Reference (Table No.) | (h) Energy Dispersal Bandwidth (kHz) | Receive Band (Assoc. Transmit Stn)      |                                     |          | Transmit Band (This Space Station) |          |  |                                |
|---------------------------------|---------|-------------------------|------------------------|------------------------------|---------------------------|--|--------------------------------------|---|-------------------------------------|----------|------------------------------------|----------|--|--------------------------------|
|                                 |         | (c) Digital (Table S11) | (d) Analog (Table S12) |                              |                           |  |                                      | (i) Assoc. Stn. Max. Antenna Gain (dBi) | Assoc. Station Transmit Power (dBW) |          | EIRP (dBW)                         |          | (n) Max. Power Flux Density (dBW/m <sup>2</sup> /Hz) | (o) Assoc. Stn Rec. G/T (dB/K) |
| (a) Start                       | (b) End |                         |                        |                              |                           |  |                                      |   | (j) Min.                            | (k) Max. | (l) Min.                           | (m) Max. |  |                                |
| T0001                           | T0016   | DTH                     |                        | 1                            |                           |  |                                      | 65.3                                    | 14.7                                | 19.7     | 51.3                               | 57.3     |  | 13                             |
| C1                              |         |                         | CMD                    | 1                            |                           |  |                                      | 65.3                                    | -4.9                                | 47.1     |                                    |          |  |                                |
| T1                              | T2      |                         | TLM                    | 1                            |                           |  |                                      |   |                                     |          | 12                                 | 18.3     |  | 40                             |

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Page 10: TT and C

S14. Is the space station(s) controlled and monitored remotely? If Yes, provide the location and telephone number of the TT and C control point(s): Yes

**Remote Control (TT C) Location(s):**

|  |                             |   |                          |
|--|-----------------------------|---|--------------------------|
| S14a: Street Address:<br>5130 Robert J. Mathews Pkwy |                             |   |                          |
| S14b. City:<br>El Dorado Hills                       | S14c. County:<br>Sacramento | S14d. State/Country<br>CA                                       | S14e. Zip Code:<br>95762 |
| S14f. Telephone Number:<br>916 605 5401              |                             | S14g. Call Sign of Control Station (if appropriate):<br>E030105 |                          |

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**Page 11:**  
**Characteristics and**  
**Certifications**

**S15. SPACECRAFT PHYSICAL CHARACTERISTICS:**

|  |                                   |   |
|--|-----------------------------------|---|
| S15a. Mass of spacecraft without fuel (kg):<br>1487.9            | Spacecraft Dimensions<br>(meters) | Probability of Survival to<br>End of Life (0.0 - 1.0) |
| S15b. Mass of fuel and disposables at launch (kg):<br>2220       |                                   |   |
| S15c. Mass of spacecraft and fuel at launch (kg):<br>3707.9      | S15f. Length (m):<br>31.3         | S15i. Payload:<br>0.8845                              |
| S15d. Mass of fuel, in orbit, at beginning of life (kg):<br>1468 | S15g. Width (m):<br>8.7           | S15j. Bus:<br>0.9115                                  |
| S15e. Deployed Area of Solar Array (square meters):<br>60.6      | S15h. Height (m):<br>6.2          | S15k. Total:<br>0.8062                                |

**S16. SPACECRAFT ELECTRICAL CHARACTERISTICS:**

| Spacecraft<br>Subsystem            | Electrical Power (Watts) At<br>Beginning of Life |             | Electrical Power (Watts) At<br>End of Life |             |
|------------------------------------|--|-------------|--|-------------|
|                                    | At Equinox                                       | At Solstice | At Equinox                                 | At Solstice |
| Payload (Watts):                   | (a): 5958  | (f): 5958   | (k): 5763                                  | (p): 5763   |
| Bus (Watts):                       | (b): 1864  | (g): 955    | (l): 1874                                  | (q): 594    |
| Total (Watts):                     | (c): 7833  | (h): 6913   | (m): 7637                                  | (r): 6717   |
| Solar Array (Watts):               | (d): 9340  | (i): 8379   | (n): 8399                                  | (s): 7659   |
| Depth of Battery<br>Discharge (%): | (e) 74 %   | (j) 0 %     | (o) 72 %                                   | (t) 0 %     |

**S17. CERTIFICATIONS:**

|  |   |                             |   |
|--|---|-----------------------------|---|
| a. Are the power flux density limits of § 25.208 met?:   | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A            |
| b. Are the appropriate service area coverage requirements of § 25.143(b)(ii) and (iii), or § 25.145(c)(1) and (2) met? | <input type="checkbox"/> YES            | <input type="checkbox"/> NO | <input checked="" type="checkbox"/> N/A |
| c. Are the frequency tolerances of § 25.202(e) and the out-of-band emission limits of § 25.202(f)(1), (2) and (3) met? | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A            |

**In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the Commission's rules, 47 C.F.R. § 25.114.**